

REMARKS

Review of the references cited has indicated that the patentable claims in this application are broader than those on file. Accordingly, an RCE has been filed in order to present such claims for consideration by the Examiner. Amended claim 1 is supported, *inter alia*, at page 11, lines 13-16 which indicate that after the substrate reached the film-forming temperature, introduction of the raw material solution into the two-fluid nozzle was started.

Claims 1-3, 9 and 12-14 were rejected under 35 USC 103 over Hayashi in view of Solayappan and Tisone, and claims 4-8, 10 and 11 over the same combination in further view of Ogi. It is respectfully submitted that both of these rejections should be withdrawn.

The Hayashi patent teaches a process in which a liquid precursor is misted, allowed to settle in a buffer chamber, filtered and then flowed into a deposition chamber between a substrate and a barrier plate to deposit a liquid layer on the substrate. That substrate is thereafter dried to form a thin film of solid material on the substrate. It is indicated in col. 8 that during, after, or both during and after deposition, the precursor liquid can be treated to form a thin film. “In this context, ‘treated’ means any one or a combination of the following: exposed to vacuum, ultraviolet radiation, electric poling, drying, heating, and annealing. . . . After deposition, the material is deposit on the substrate 5 . . . then is heated, and then annealed Drying occurs in step P26 to remove volatile organic moieties to form the thin film of solution on the substrate.” While Hayashi may teach heating a substrate in a film-forming process, it is clear that the heating process of Hayashi takes place after deposition. In contrast, the substrate in the present invention is heated to the film-forming temperature before introducing the metal compound solution into the film forming chamber. This aspect of the invention is not taught or suggested in Hayashi.

The Solayappan, Tisone, and Ogi references do not cure this basic deficiency in Hayashi.

With respect to new claim 20 and 21, Applicant believes that the arguments presented in the amendments filed on January 22, 2003 and June 11, 2003 remain valid and they are hereby incorporated herein by reference. It is again pointed out that the references do not teach or suggest atomizing and directly introducing a solution into a substrate-containing film-forming chamber which is being maintained at a pressure of about 100 Torr or lower, and forming the complex oxide thin-film on the substrate in the chamber at a temperature of a least the boiling point of the solvent. In the invention, that is accomplished because the nozzle in which the solution is atomized opens into the film-forming chamber. In contrast, the Hayashi patent requires the formation of a colloidal mist which, after being filtered, is flowed into a deposition chamber to deposit a liquid layer on the substrate. As pointed out on the bottom of page 18 of this application, by directly introducing the atomized solution into the film-forming chamber from the two-fluid nozzle, the atomized solution does not need to be carried by a piping or similar apparatus. Hayashi's process, on the other hand, generates the mist which is then allowed to settle in a buffer chamber and filtered before it is introduced into the deposition chamber.

The Office Action takes note that Hayashi and Solayappan do not teach or suggest that atomization takes place within the nozzle, and therefore, cites Tisone. However, Tisone discharges atomized material onto a substrate at atmospheric conditions. The Office Action does not propose anything which would motivate a person skilled in the art to employ Tisone in a vacuum situation. Combining Tisone with the other references is, therefore, clearly hindsight, which is not permitted.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. According, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

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